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CONFERENCE ON SOIL CORROSION

On November 15 to 17, inclusive, a conference was held at the Bureau on the causes and prevention of corrosion of pipe lines buried in the ground. This conference was the fourth of these meetings to be held under the Bureau's auspices and was organized by K. H. Logan, chief of the section on underground corrosion. About 70 delegates representing 7 countries were in attendance, giving the conference an international aspect and emphasizing the widespread interest in this problem. That engineers should be greatly concerned with questions involving the corrosive action of soils on buried pipe is not surprising when it is remembered that the loss from this cause is estimated at \$100,000,000 a year in this country alone.

Eighty-two papers, including 18 by foreign delegates, were discussed at the conference. They included such subjects as: Soil corrosion and electrolysis, soil tests and surveys, measurements of the depth of pitted places

on the surface of pipes, determination of the conditions of pipe lines, and protection of pipe lines by coatings. In order to insure intelligent discussion of so many papers in a limited time, copies of each of the papers were sent several weeks in advance to each member of the conference and at the meeting a digest of these was presented by an expert in each phase of the subject.

BITUMINOUS COATINGS FOR UNDERGROUND SERVICE

RP1058, by K. H. Logan, in the Journal of Research for December summarizes the work on protective coatings for pipe lines conducted at the Bureau by the underground corrosion section, including the projects financed by the American Gas Association and the American Petroleum Institute. The summary is made at this time because all research work on protective coatings has been indefinitely suspended. Heretofore, reports on coatings have consisted largely of comparisons of the relative effectiveness of coatings. In

¹ Published with approval of the Director of the Budget.

this paper an attempt is made to express the effectiveness of a few of the coatings in terms of the leak frequency on a pipe line of standard wall thickness. This is done by the application of Scott's pit-depth-area relation. For most of the better coatings the data cover exposures of but 4 years. This period is too short to permit the use of Scott's formula without very large extrapolations.

New data are given on the physical properties of the bitumens used in the API tests. New data are also presented on the performance of 4 coatings after 12 years' exposure. A high-melting-point coal-tar-pitch coating reinforced by a loosely woven cotton cloth impregnated with the pitch proved to be a very effective coating in most soils to which it was exposed. An asphalt coating reinforced by cotton fabric was found to be less effective than an unreinforced asphalt coating of about the same thickness. In many soils the fabric rotted until it almost disappeared.

Thin coatings applied as paints by brushing or dipping were not very effective. A number of pipes so protected developed deeper pits than were found on corresponding unprotected specimens. Nevertheless, the thin coatings reduced the number of pits. Shielding the thin coatings reduced the pit depths, but did not result in complete protection.

The comparison of data on several emulsion coatings, some of which were shielded, yielded little information as to the relative merits of the different emulsions. None appeared to be entirely satisfactory.

The performance of bituminous enamels has been studied in some detail because this is a commonly used type of coating. The conclusion is reached that none of the enamels tested was superior to all others under all soil conditions. The incorporation of a fabric in the enamel coating, or the covering of the enamel by a fabric or metal shield, reduces the amount of penetration of the enamel by clods and stones and thus increases the protection afforded by the coating. The use of a reinforcing fabric usually results in the use of more bitumen and therefore in better water-resisting qualities. On the other hand, organic reinforcements rot and tend to act as wicks, which draw water into the coating.

The available data on grease coatings are insufficient to justify definite conclusions as to the general usefulness of this type of coating. The reinforced grease coating applied to work-

ing lines afforded about the same degree of protection as other coatings of approximately the same thickness. Unfortunately, this coating was not exposed to the most corrosive soils.

The most effective coating was a mixture of asphalt and graded inerts. Its thickness was approximately 0.5 inch. Even this coating did not provide perfect protection to all of the pipe line to which it was applied.

As a whole, the data indicate that most of the coatings offer sufficient protection to justify their application to pipes exposed to corrosive soils, but no coating offered complete protection in all soils in which it was tested for as long as 4 years.

GALLONAGE TABLES FOR HORIZONTAL CYLINDRICAL TANKS

Horizontal cylindrical tanks with flat ends are largely used in the petroleum oil industry. E. L. Peffer of the Bureau's Weights and Measures Division has prepared tables so that the contents of completely and partially filled tanks may readily be obtained corresponding to the inside measurements.

The table shows the volume, in gallons, of a section 1 inch in length, for tanks of various diameters filled to various depths. The total volume of liquid in a tank filled to a given depth can be obtained by multiplying the tabulated volume per inch in length, for a given diameter of tank and depth of liquid, by the length of the tank, in inches.

This publication, Circular C416, is obtainable from the Superintendent of Documents, Government Printing Office, at 5 cents a copy.

DANGERS OF PLUG FUSES

The bridging of electric fuses is a long-standing evil and has resulted in many fires and some casualties, as this action destroys the protection with which electric circuits are supposed to be provided against overloads and short-circuits. A paper prepared by Morton G. Lloyd, chief of the Bureau's section on safety codes, for publication in the Proceedings of the International Association of Electrical Inspectors, deals only with the plug fuse and recites about 130 instances of fires which would probably have been prevented if the plug fuse in the circuit had been permitted to function in the normal way. Eight fatalities are cited where persons have lost their lives in fires brought about by a condition of bridged fuses or the substitution of a fuse of too large capacity.

Attention is called to the new non-tamperable type of plug fuse, which it is not practicable to bridge internally, and if bridged at all, it must be by external means, which will then be readily visible. The different sizes of this type of fuse differ in construction, so that they are not interchangeable. The use of such fuses is recommended in the 1937 edition of the National Electrical Code.

AWARD TO DEANE B. JUDD

At a banquet on October 13, in connection with the annual meeting of the Society of Motion Picture Engineers, in New York, a certificate and cash prize were awarded to Dr. Deane B. Judd of the Bureau's colorimetry section for "the most outstanding paper originally published in the Journal of the Society of Motion Picture Engineers during the year one thousand nine hundred and thirty-six." Doctor Judd's paper, entitled "Color Blindness and Anomalies of Vision," was published in the above-named Journal for June 1936.

ARC AND SPARK SPECTRA OF YTTERBIUM

The chemical elements known as the rare-earth group are characterized by chemical properties so nearly identical as to prevent their complete separation or purification by chemical means. As a consequence, their emission spectra are not accurately known and misidentifications of spectra have led to the mistaken discovery of "new" elements. The purest samples of each rare earth are almost invariably contaminated by closely related ones, but the individual spectra can be sorted by simultaneous comparison of all. The spectra of three of the rare earths, thulium, ytterbium, and lutecium, have been under investigation at the Bureau for some years, and a new description of conventional arc and spark spectra of ytterbium by William F. Meggers and Bourdon F. Scribner will be published as RP1053 in the December number of the Journal of Research. This description consists of wave-length measurements and intensity estimates of 1,668 spectral lines scattered throughout the ultraviolet, visible, and infra red. Furthermore, the lines have been sorted into three groups characteristic, respectively, of neutral atoms, singly, and doubly ionized atoms. Certain regularities found among the lines of the first two spectra are presented also. It appears now that fully two-thirds of the lines suspected of belonging to a new element, denebium, are in fact due to ytterbium.

Besides providing reliable data for the spectroscopic identification of ytterbium, these facts will serve as a basis for further study of interesting features of the various spectra.

CONVERSION OF DEUTERIUM OXIDE INTO DEUTERIUM

In connection with an investigation of the heat of formation of deuterium oxide, it was necessary to convert 1 mole of liquid deuterium oxide completely into gaseous deuterium and obtain it as a gas under pressure in a cylinder. In the Journal of Research for December (RP1050), John W. Knowlton and Frederick D. Rossini describe in detail a method and apparatus for the rapid conversion of deuterium oxide into deuterium. A glass bulb at one end of the evacuated conversion apparatus contains a sealed ampoule holding the liquid deuterium oxide. This ampoule of "heavy" water is broken by placing liquid air around the outer bulb, which is subsequently heated electrically to control the passage of the vapors of deuterium oxide into the reaction tube containing powdered magnesium at 480° C., where the following reaction occurs: $\text{Mg (solid)} + \text{D}_2\text{O (gas)} = \text{MgO (solid)} + \text{D}_2 \text{ (gas)}$. The rate of evolution of deuterium can be made as great as 1 mole in 2 hours. The evolved deuterium passes through a liquid-air filter-trap and is collected as liquid in a 50-ml brass bottle immersed in ordinary liquid hydrogen (temperature about -253° C.). The connection to the conversion apparatus is closed, that to a 1-liter brass bottle is opened, and the deuterium is permitted to vaporize and fill the two brass bottles at room temperature. In this manner 95 percent of the deuterium is obtained in the 1-liter bottle as a gas under a pressure of about 23 atmospheres.

THE GULOHEPTONIC ACIDS AND α -D-GULOHEPTOSE

As described in the Journal of Research for December (RP1052), the barium and lead salts of the guloheptonic acids have been made and used by Horace S. Isbell for the preparation of the corresponding free acids. The gamma lactone of *d*-α-guloheptonic acid was prepared and reduced with sodium amalgam to give *d*-α-guloheptose, which crystallized in the alpha modification. This new sugar is structurally related to α -l-talose and exhibits similar properties. Its mutarotation, which is complex, consists in a fast change followed or accompanied by a

smaller slow change. The proportions of the constituents involved in the rapid reaction vary with temperature so that a change in temperature results in a rapid mutarotation. The temperature coefficient for the rapid mutarotation corresponds with those for the rapid reactions which cause the deviations in the mutarotations of galactose, arabinose, talose, ribose, and *d*- β -glucoheptose, while the temperature coefficient for the slow change agrees with those for the mutarotations of glucose, mannose, gulose, and other reactions, which consist in the interconversion of the alpha and beta pyranoses. The parallelism between the properties of talose and *d*-*a*-guloheptose is evidence that the configurations of the first five carbon atoms determine in large measure the composition of equilibrium solutions of these sugars.

USE OF ARSENIOS OXIDE IN STANDARDIZATION OF POTASSIUM PERMANGANATE

Chemical analysis, employing volumetric methods, requires the use of primary standards for fixing the concentration of standard solutions used in titrations. Harry A. Bright of the Bureau's Chemistry Division has recently done some work on the use of arsenious oxide in standardizing solutions of potassium permanganate. It was found that when small amounts of potassium iodide or iodate were used as a catalyst (Lang's procedure), the values obtained for the strength of the permanganate solutions were accurate to within 1 part in 3,000 or better. The Bureau's Standard Sample, Arsenious Oxide 83, is therefore suitable as a direct primary standard in permanganimetry. This matter is more fully discussed in RP1057 in the December number of the Journal of Research.

EFFECT OF YAW ON VANE ANEMOMETERS

In determining the free-air deliveries of electric fans of the circulator type, conditions of nonaxial flow were frequently encountered. In some cases the direction of air flow was found to be inclined 20° or more, to the axis of the fan. Under these conditions the use of a vane anemometer, mounted with its axis parallel to the fan axis, to determine velocities may give rise to error unless a correction factor, for the effect of inclination, is applied to the anemometer readings. For this reason the effect of air-stream inclination on three vane anemometers used in the laboratory was investigated by Roy H.

Heald and Paul S. Ballif of the Bureau's aerodynamics section. The observations were made in the wind tunnel for angles of yaw within a range of 35° on either side of the zero position. For the three anemometers tested, the maximum positive error occurred when the angle of yaw was about 15°. The results, which are presented in detail in the Journal of Research for December (RP1056), indicate that the magnitude of the directional error depends largely on design of the anemometer.

ELECTRICAL THERMOMETERS FOR AIRCRAFT

Electrical thermometers for aircraft use possess two important advantages—they are remote indicating and they can be constructed to have less time lag than other types.

At present, thermoelectric thermometers are quite generally used on airplanes to measure the temperature of the engine cylinder heads, a service for which they are eminently suited, since the thermocouple is small and can be easily attached so as to make good thermal contact.

In the flight testing of aircraft, the Bureau of Aeronautics of the United States Navy Department uses resistance thermometers to measure the air temperatures. In this case a low time-lag is important because measurements must be made when the temperature is changing rapidly, as is the case when the airplane is climbing or descending. The distant indicating feature is also essential because it is necessary to place the temperature sensitive element at some distance from the engine and its exhaust.

In operating airships it is necessary to know the superheat, or the difference in temperature of the lift gas and the air, for which purpose electrical thermometers of either the thermoelectric or resistance type are well adapted. Superheat meters must be of the electrical type in view of the long distances of the temperature-sensitive elements from the indicator in the control car of the airship.

Technical Report 606, prepared with the financial assistance of the National Advisory Committee for Aeronautics, contains a description of these instruments, and data on their design and performance. The resistance thermometer and superheat meters therein described were developed at the Bureau for the Bureau of Aeronautics of the Navy Department. Copies of this report are obtainable from the Super-

intendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

DIMENSIONAL CHANGES IN AERIAL PHOTOGRAPHIC FILMS AND PAPERS

Photographic films and papers are hygroscopic, consequently they absorb and lose water, depending upon the hygrometric state of the air. At equilibrium with the air the gain or loss of water in films is accompanied by dimensional changes amounting to about 0.008 percent for each 1 percent change of relative humidity. Processing film results in a shrinkage ranging from 0.01 to 0.11 percent, the average for films conditioned at 50 percent relative humidity being about 0.06 percent in the crosswise and 0.04 percent in the lengthwise direction, a differential shrinkage (difference in the two directions) of 0.02 percent.

In addition to the above changes in dimensions, the film base is constantly losing solvents, which results in a continued shrinkage. Recently, Raymond Davis and Emory J. Stovall made some tests under accelerated aging conditions, that is, the film was kept at a fixed temperature of 49° C (120° F) for periods varying from 1 to 32 days. These data, when plotted with percentage of shrinkage versus logarithm of the time in days, lie approximately in a straight line. The shrinkage is greater in the crosswise than in the lengthwise direction, and the rate of shrinkage is greater in the crosswise direction.

The time required for film to reach moisture equilibrium condition with the air was studied by subjecting the film to 49° C (120° F) for two days and then transferring it to the controlled air of the conditioning room. A series of measurements was made at intervals beginning immediately and extending over 16 days. Under the imposed conditions the film was absorbing water very rapidly during the first hour or two, the rate of change continually diminishing. When plotted as percentage of shrinkage versus logarithm of conditioning time in days, the curves indicated that about 100 days would be required for the film to reach equilibrium. The rate of change after one day is sufficiently small to permit the use of a 1- or 2-day conditioning time for testing purposes.

A different value of shrinkage in the crosswise and lengthwise directions (differential shrinkage) means an actual distortion of the photographic image on the films. When film negatives

are printed or duplicated the distortion of the two materials (negative and positive) will be additive if the lengthwise directions are parallel during exposure. Crossing these directions, the resulting distortion will be equal to the difference in differential shrinkage of the two materials. The correction will be perfect if the two materials have identical differential shrinkage.

Nitrate films are used exclusively for aerial surveying. This material decomposes spontaneously. Its useful life depends upon several factors, principally, its history of manufacture, processing, and storage conditions. It cannot be relied upon, under average conditions, to last 20 years. In addition it is very inflammable, and in large quantities, if not properly safeguarded, becomes a serious fire hazard. On the other hand, acetate film can be quite stable chemically, consequently, will have a much longer life, is about in a class with paper from a fire-hazard standpoint and with the few samples that have been tested at the Bureau, the shrinkage is not different from the nitrate film. A further study of acetate film should be made as it would undoubtedly yield interesting results.

For a complete account of this work, RP1051 in the December number of the Journal of Research should be consulted.

EXPANSION TEST FOR OFFSET PAPERS

The expansion and contraction of paper with changing moisture content is a serious problem with many users, particularly in multicolor offset lithography where slight expansion of the paper in process will cause serious loss. An important factor in control of the difficulty is the selection of paper with comparatively low hygrometric expansivity. A method of measuring the expansivity for a wide range of atmospheric humidities has been developed by Charles G. Weber and Martin N. V. Gelb of the Bureau's paper section.

As described in the December number of the Journal of Research (RP1054), specimens of paper are mounted under tension in a cabinet in which humidity is controlled by salt solutions. Changes in length of the paper are measured by means of an optical lever, and the hygrometric conditions around the paper are determined with a wet- and dry-bulb hygrometer. The method has satisfactory precision, and the apparatus necessary is simple to construct and easy to operate. With it, the response of paper to a wide range of atmospheric conditions can be determined conven-

iently without air conditioning in the room and without tedious or difficult measurements. The device for making the test can be constructed in the average shop and operated in print shop, paper mill, or laboratory.

The new method was developed in connection with the study of lithographic papers. This investigation is being carried on at the Bureau with the cooperation and financial support of the Lithographic Technical Foundation, paper manufacturers, printing-equipment manufacturers, and air-conditioning engineers.

MOISTURE CONTENT OF TEXTILES UNDER CONSTANT DRYING CONDITIONS

The following is an abstract of a statement given by James G. Wiegand, research associate on textile drying, USITR, at the annual meeting of the United States Institute for Textile Research in New York on November 12:

The first step in the textile drying research program in progress at the Bureau for the United States Institute for Textile Research is to determine the moisture content of textiles under constant drying conditions. The range of conditions to be studied at first includes: Temperatures from room to 300° F, relative humidities from 1 to 95 percent for temperatures up to 212° F, and to the maximum relative humidities obtainable at atmospheric pressure for temperatures between 212 and 300° F, air flows up to 0.5 cubic foot per minute in a chamber of 2.5 cubic feet capacity.

The new equipment for studying the moisture relations of textiles is now being constructed. Means are provided in this equipment for measuring the rates of drying of 12 samples under the varying conditions of temperature, relative humidity and air flow, as well as the final moisture contents at equilibrium.

The textiles selected for this study by the administration committee include gray cotton, boiled-off cotton, mercerized cotton, clothing wool, carpet wool, raw silk, boiled-off silk, viscose rayon, cuprammonium rayon, and acetate. These textiles are to be studied after purification by extraction with suitable solvents, and also as received. The preparation of the textiles for study is well advanced.

The second step in the drying study will be to correlate the moisture contents of the textiles at various temperatures and humidities with their physical and chemical properties. This part

of the program will be concerned with limiting conditions beyond which the textiles will be damaged in drying and with the optimum conditions for the different textiles.

IMPROVED APPARATUS FOR MEASURING THE THERMAL TRANSMISSION OF TEXTILES

The measurement of the transfer of heat through textile fabrics is an ever-important problem. Garments, bed-clothing, and the like, vary in warmth. Cool fabrics are produced for use in summer and warm ones for winter. Manufacturers would like to know the thermal transmission of the fabrics they produce and consumers are asking for more information about the textiles they buy, including information about the thermal transmission.

New apparatus for measuring thermal transmission of textiles has been designed and built in the bureau's textile section by Richard S. Cleveland. With the new instrument, the speed of testing is increased considerably over that obtained with previous equipment and without sacrifice of accuracy.

The fabric to be tested is laid upon an electrically heated hot plate. Loss of heat from the plate except upward through the fabric to the air above it is prevented by electrically heated guard plates. A hood is placed over the fabric to prevent disturbance by air currents during the test. When a steady state is reached, the energy required to maintain the hot plate at body temperature or some other chosen temperature is observed.

The regulation of temperatures is essentially automatic and little attention is required of the operator except during the 15 minutes a test is actually in progress. Seven tests can be made in an 8-hour day, including the time required to bring the apparatus to a steady state. Results are reproducible to within about 1 percent. A complete description of the apparatus will be published as RP1055 in the December number of the Journal of Research.

DETERIORATION OF LEATHER BY ACID

An error occurs in the listing of an article under Recent Bureau Articles Appearing in Outside Publications, on page 122 of Technical News Bulletin 247 (November 1937). The title of the seventh article should read "The deterioration of leather by acid," instead of "determination of leather by acid." The remainder of the reference is correct.

SIMPLIFIED PRACTICE RECOMMENDATION FOR HOSPITAL BEDS

Simplified Practice Recommendation R24, Hospital Beds, has been reissued as of December 1, 1937, and is designated as R24-37.

The promulgation in 1922 of Simplified Practice Recommendation R2, which established a simplified list of sizes for bedsteads, springs, and mattresses for household use, suggested similar action with regard to hospital beds. As a first step in the movement to reduce superfluous varieties, a survey of existing diversity of sizes was made in 1923 by the American Hospital Association's Committee on Simplification and Standardization of Furnishings, Supplies, and Equipment. Upon completion of the survey, which revealed more than 110 varieties of lengths, widths, and heights of hospital beds, the Bureau was requested to call a general conference of all interested to consider a recommendation covering standard dimensions. This conference approved a schedule, which became effective January 1, 1925, and which covered one standard length, one standard and two special widths, and one standard height for hospital beds for general, special, institutional, and private-room use.

The standing committee, which was appointed to have charge of the review of this recommendation, reaffirmed the list of recommended sizes in 1926, 1929, and 1935.

In 1936, at the request of the standing committee, the Division of Simplified Practice conducted a comprehensive survey to determine whether the established sizes, as given in R24, still conformed to the sizes of beds commonly used by the hospitals. A summary of the replies to a questionnaire submitted by more than 1,600 hospitals, and covering approximately 450,000 beds, disclosed considerable diversity in lengths, widths, and heights. However, it was clearly apparent that beds having the dimensions adopted as standard in 1925 are in general use by the hospitals, and that purchases of standard-type beds are gaining steadily. In view of these facts the recommendation in its existing form again was reaffirmed, in August 1937.

The new printed edition will include, in addition to the schedule of sizes and a brief history of the project, a summarized report of the recent variety survey, a current list of the members of the standing committee, and an augmented list of acceptors.

Pending the receipt of the printed edition, free mimeographed copies of

the recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

REVISED SIMPLIFIED PRACTICE RECOMMENDATION FOR ROOFING TERNE

Simplified Practice Recommendation R30-37, Roofing Ternes, the second revision of this program, became effective on November 1, 1937.

This recommendation was initiated in 1923 by manufacturers of roofing ternes, who, through their trade association, requested the Bureau's cooperation in a movement to reduce superfluous varieties. It was felt that such a program would assist the entire industry by eliminating from manufacture and from jobbers' stocks, unnecessary weights, thicknesses, and finishes of roofing terne.

At a preliminary conference on May 20, 1923, a committee was appointed to make a variety survey and to recommend such eliminations as would be to the advantage alike of producers, distributors, and users. Upon completion of the work of this committee a general conference of all interests was called for October 15, 1924. This conference approved a simplified schedule providing for seven weights of coating for roofing terne, and specifying minimum thickness. The recommendation, upon approval of all concerned, became effective as of January 1, 1925. Since that time the schedule has been reaffirmed repeatedly by the industry's standing committee, as it has been found to be meeting the needs of all interests in a satisfactory manner. The first revision effective January 1, 1928, changed the title of the recommendation from "Terneplate" to "Roofing Ternes."

At a meeting in Cleveland, Ohio, on May 5, 1937, the National Association of Sheet Metal Manufacturers and Distributors reaffirmed the simplified schedule of weights of coating included in R30-28, and suggested that this recommendation be amplified to include a packaging schedule and a method of marking. The proposed additions met with the approval of all members of the standing committee and were found acceptable to the industry generally, following which the Bureau announced that the revised recommendation would be promulgated and reissued as R30-37.

The new printed edition will include a brief history of the project, and will list the members of the standing committee and the acceptors of the recommendation. Until printed copies are available, free mimeographed copies of

the revision may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

SIMPLIFICATION OF SIZES OF MACHINE, CARRIAGE, AND LAG BOLTS

A new Simplified Practice Recommendation, R169-37, Machine, Carriage, and Lag Bolts, became effective on November 1, 1937.

This recommendation was developed by the American Institute of Bolt, Nut, and Rivet Manufacturers, and establishes a simplified schedule of stock-production sizes for square- and hexagon-head machine bolts, square-neck carriage bolts, and lag bolts. The schedule consists of four tables giving the stock items of maximum demand and those least frequently used. The satisfactory results accomplished through the establishment, in 1927, of Simplified Practice Recommendation R60, covering packaging of carriage, machine, and lag bolts, prompted the industry to undertake the present project establishing standard sizes of these bolts.

The schedule of recommended stock-production sizes is based on a comprehensive study made by the Committee on Standards and Technical Practices of the American Institute of Bolt, Nut, and Rivet Manufacturers. This committee sent a questionnaire to the manufacturers to ascertain the variety in sizes of bolts produced, and to determine from analysis of the production and sales records the sizes most frequently used and, therefore, those which can be produced in anticipation of a known demand.

Prior to its final circularization to manufacturers, distributors, and users for acceptance, a preliminary draft of the proposed recommendation was submitted by the Institute to a representative group of bolt manufacturers for their consideration and approval or comment. An analysis of the replies received indicated that the companies approving the proposal constitute about 72 percent of the firms manufacturing such bolts, and 91 percent of the total volume of business in these products.

According to an estimate of the proposed organization, the adoption of this simplified practice program will effect a reduction from 896 to 584 sizes of bolts of the types covered, or an elimination of approximately 35 percent. This substantial reduction in number of sizes to be produced for stock should create material savings through reduced costs of production and distribution.

Moreover, consumers will be assured of prompt shipment of orders, as they will know which sizes are readily available from manufacturers' or distributors' stocks.

A permanent standing committee, representing the interests of manufacturers, distributors, and users, has been appointed to maintain this recommendation abreast of current conditions and best practice in the industry. The chairman of this committee is Harry C. Graham, chairman of the Committee on Standards and Technical Practices, American Institute of Bolt, Nut, and Rivet Manufacturers, Cleveland, Ohio.

In addition to the simplified list of stock items, the printed issue will include a brief statement of the development of the project, the membership of the standing committee, and a list of organizations and firms that have accepted the recommendation.

Until the printed recommendation is available, free mimeographed copies may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

NEW AND REVISED PUBLICATIONS ISSUED DURING NOVEMBER 1937

Journal of Research¹

Journal of Research of the National Bureau of Standards, volume 19, number 5, November 1937 (RP1040 to RP1049, inclusive). Price 25 cents. Obtainable by subscription.

Research Papers¹

[Reprints from September and October 1937 issues of the Journal of Research]

RP1024. Calorimetric determination of the heats of combustion of ethylene and propylene. Frederick D. Rossini and John W. Knowlton. Price 5 cents.

RP1025. Extraction of Jerusalem-artichoke juices in an experimental diffusion battery. Max J. Proffitt, John A. Bogan, and Richard F. Jackson. Price 5 cents.

RP1027. Paraffin hydrocarbons isolated from crude synthetic isooctane (2, 2, 4-trimethylpentane). Donald B. Brooks, Robetta B. Cleaton, and Frank R. Carter. Price 5 cents.

¹ Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to Technical News Bulletin, 50 cents per year; Journal of Research, \$2.50 per year (United States and its possessions, and Canada, Cuba, Mexico, Newfoundland, and the Republic of Panama); other countries, 70 cents and \$3.25, respectively.

- RP1028. Heats of combustion and of formation of the normal olefin (alkene-1) hydrocarbons in the gaseous state. Frederick D. Rossini and John W. Knowlton. Price 5 cents.
- RP1029. Measurements of certain physicochemical constants of benzene. Mieczysław Wojciechowski. Price 5 cents.
- RP1030. Deformation and Young's modulus of fire-clay brick in flexure at 1,220° C. Raymond A. Heindl and William L. Pendergast. Price 10 cents.
- RP1032. Electrical character of the spark discharge of automotive ignition systems. Melville F. Peters, George F. Blackburn, and Paul T. Hannen. Price 10 cents.
- RP1035. Mutarotation of *l*-sorbose. William Ward Pigman and Horace S. Isbell. Price 5 cents.
- RP1036. Recombination of ions in the afterglow of a cesium discharge. Fred L. Mohler. Price 5 cents.
- RP1039. X-ray diffraction patterns of sol, gel, and total rubber when stretched, and when crystallized by freezing and from solutions. George L. Clark, Enno Wolthuis, and W. Harold Smith. Price 10 cents.

Circulars¹

- C416. Gallonage tables for horizontal cylindrical tanks with flat ends. Elmer L. Peffer. Price 5 cents.

Simplified Practice Recommendations¹

- R155-37. Cans for fruits and vegetables (names and dimensions). (Supersedes R155-34.) Price 5 cents.

Technical News Bulletin¹

Technical News Bulletin 247, November 1937. Price 5 cents. Obtainable by subscription.

MIMEOGRAPHED MATERIAL

Letter Circulars

Letter circulars are prepared to answer specific inquiries addressed to the National Bureau of Standards and are sent only on request to persons having definite need for the information. The Bureau cannot undertake to

¹ Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to Technical News Bulletin, 50 cents per year; Journal of Research, \$2.50 per year (United States and its possessions, and Canada, Cuba, Mexico, Newfoundland, and the Republic of Panama); other countries, 70 cents and \$3.25, respectively.

supply lists or complete sets of Letter Circulars or to send copies automatically as issued.

- LC502-D. Rain penetration in walls, waterproofing of masonry walls and the properties of joints in masonry in relation to low-cost housing.
- LC502-G. Roofing materials for low-cost housing construction.
- LC502-H. Surface treatment for corrosion protection of steel members for low-cost housing construction.
- LC502-I. Investigation of plastic caulking materials for low-cost housing construction.
- LC505. Classification of acoustic materials.
- LC506. Sound-absorption coefficients of the more common materials. (Supersedes LC477.)
- LC507. Publications on polarimetry and its application to the sugars and their derivatives.

Technical Information on Building Materials

The supply of these notes, each of which consists of three or four pages giving the important facts on some one aspect of the properties or use of building materials, is necessarily limited. Their distribution will be confined to Government officials concerned with building projects, and to architects, engineers, and home builders. Requests should make clear the actual need for the information at the time of writing. Letters should be addressed to the Division of Codes and Specifications, National Bureau of Standards, Washington, D. C. The following notes were issued since the list published in the November 1937 number of the Technical News Bulletin:

- TIBM-56. Plastic caulking and pointing materials: Part II.
- TIBM-57. Weathering properties of building brick.

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² These publications are not obtainable from the Government unless otherwise stated. Requests should be sent direct to the publishers.

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